Cover Stories:

Major Scientific Publications Featuring NRI-funded Research

Knowledge For Tomorrow's Solutions

United States Department of Agriculture

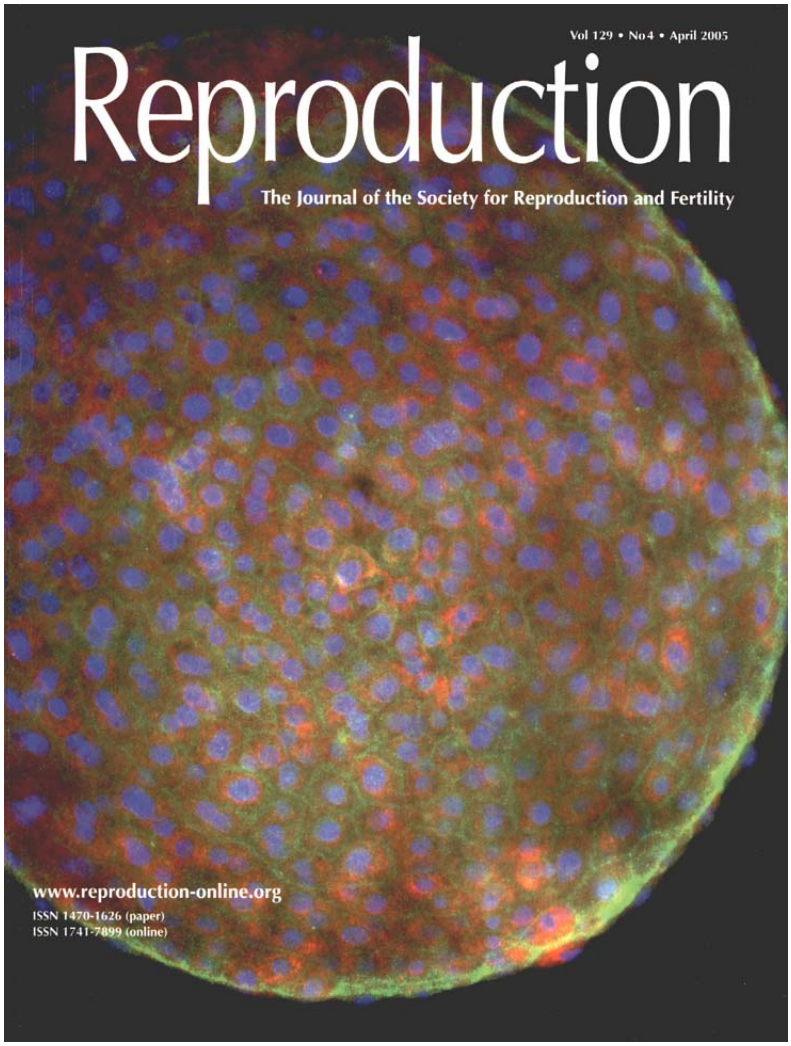
USDA

CSREES

Cooperative State Research, Education, and Extension Service

National Research Initiative Competitive Grants Program

2006 No. 3



Cover reprinted with permission by the Society for Reproduction and Fertility

P. Sutovsky, G. Manandhar, J. Laurincik, J. Letko, J.N. Caamaño, B.N. Day, L. Lai1, R. S. Prather, K.L. Sharpe-Timms, R. Zimmer, M. Sutovsky. 2005. ***Expression and Proteasomal Degradation of the Major Vault Protein (MVP) in Mammalian Oocytes and Zygotes.*** *Reproduction 129(3):269-282.*

Early stages of embryo development determine the ability of human and animal embryos to successfully implant and develop in the uterus. Thus, the reproductive efficiency of farm animals as well as the reproductive success of human couples seeking infertility treatment may be improved by identifying embryonic cell-produced cell protective factors. The NRI-sponsored research by Sutovsky et al. identified one such cell protecting factor, Major Vault Protein (MVP) also called Lung Resistance-related Protein (LRP), in the pig pre-implantation embryos. The MVP/LRP protein is a cell-produced protecting factor that appears to covey multi-drug resistance in cancer cells during chemotherapy. Sutovsky et al. determined that MVP/LRP is produced by pig embryos throughout early stages of development, suggesting that it could be one of the factors that protect preimplantation embryos from negative epigenetic influences, such as drug treatments and effects of mechanical, chemical and hormonal treatments encountered during assisted reproduction. Accordingly, the authors observed increased accumulation of MVP/LRP in aberrant pig embryos produced by nuclear transfer procedures and in the discarded, poor quality human ova not suitable for assisted fertilization that were donated for research by informed, consenting couples treated for infertility. These initial findings suggest MVP could play a role in mammalian oogenesis and/or early development, and could be exploited as a potential oocyte/embryo quality marker in assisted reproduction.

This research was supported by the Animal Reproduction Program of the Competitive Programs Unit.

Designed and produced in cooperation with the National Agricultural Library, ARS, USDA